



EX65 Explosion-protected Illuminator

LED Series



BOSCH

en Instruction Manual

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1 Safety

1.1 Safety precautions

**DANGER!**

High risk: This symbol indicates an imminently hazardous situation such as “Dangerous Voltage” inside the product.

If not avoided, this will result in an electrical shock, serious bodily injury, or death.

**WARNING!**

Medium risk: Indicates a potentially hazardous situation.

If not avoided, this could result in minor or moderate bodily injury.

**CAUTION!**

Low risk: Indicates a potentially hazardous situation.

If not avoided, this could result in property damage or risk of damage to the unit.


1.2 Important safety instructions

Read, follow, and retain for future reference all of the following safety instructions. Heed all warnings on the unit and in the operating instructions before operating the unit.

1. **Cleaning** - Unplug the unit from the outlet before cleaning. Follow any instructions provided with the unit. Generally, using a dry cloth for cleaning is sufficient but a moist, fluff-free cloth or leather shammy may also be used. Do not use liquid cleaners or aerosol cleaners.
2. **Heat Sources** - Do not install the unit near any heat sources such as radiators, heaters, stoves, or other equipment (including amplifiers) that produce heat.
3. **Ventilation** - Any openings in the unit enclosure are provided for ventilation to prevent overheating and ensure reliable operation. Do not block or cover these openings. Do not place the unit in an enclosure unless proper ventilation is provided, or the manufacturer's instructions have been adhered to.
4. **Water** - Do not use this unit near water (for example, near a bathtub, washbowl, sink, laundry basket, in a damp or wet basement, near a swimming pool, in an outdoor installation, or in any area classified as a wet location), unless it is completely installed and sealed. To reduce the risk of fire or electrical shock, do not expose this unit to rain or moisture, unless it is completely installed and sealed.
5. **Object and liquid entry** - Never push objects of any kind into this unit through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electrical shock. Never spill liquid of any kind on the unit, unless it is completely installed and sealed. Do not place objects filled with liquids, such as vases or cups, on the unit, unless it is completely installed and sealed.
6. **Lightning** - For added protection during a lightning storm, or when leaving this unit unattended and unused for long periods, unplug the unit from the wall outlet and disconnect the cable system. This will prevent damage to the unit from lightning and power line surges.
7. **Controls adjustment** - Adjust only those controls specified in the operating instructions. Improper adjustment of other controls may cause damage to the unit. Use of controls or adjustments, or performance of procedures other than those specified, may result in hazardous radiation exposure.

8. **Overloading** - Do not overload outlets and extension cords. This can cause fire or electrical shock.
9. **Power supply cord and plug protection** - Protect the power supply cord and plug from foot traffic, being pinched by items placed upon or against them at electrical outlets, and its exit from the unit. For units intended to operate with 230 VAC, 50 Hz, the power supply cord must comply with the latest versions of *IEC 60227*. For units intended to operate with 120 VAC, 60 Hz, the power supply cord must comply with the latest versions of *UL 62* and *CSA 22.2 No.49*.
10. **Power disconnect** - Units have power supplied to the unit whenever the power cord is inserted into the power source. The power cord plug is the main power disconnect device for switching off the voltage for all units.
11. **Power sources** - Operate the unit only from the type of power source indicated on the label. Before proceeding, be sure to disconnect the power from the cable to be installed into the unit.
 - For battery powered units, refer to the operating instructions.
 - For external power supplied units, use only the recommended or approved power supplies.
 - For limited power source units, this power source must comply with *EN60950*. Substitutions may damage the unit or cause fire or shock.
 - For 24 VAC units, voltage applied to the unit's power input should not exceed $\pm 10\%$, or 28 VAC. User-supplied wiring must comply with local electrical codes (Class 2 power levels). Do not ground the supply at the terminals or at the unit's power supply terminals.
 - If unsure of the type of power supply to use, contact your dealer or local power company.
12. **Servicing** - Do not attempt to service this unit yourself. Opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
13. **Damage requiring service** - Unplug the unit from the main AC power source and refer servicing to qualified service personnel when any damage to the equipment has occurred, such as:
 - the power supply cord or plug is damaged;
 - exposure to moisture, water, and/or inclement weather (rain, snow, etc.);
 - liquid has been spilled in or on the equipment;
 - an object has fallen into the unit;
 - unit has been dropped or the unit cabinet is damaged;
 - unit exhibits a distinct change in performance;
 - unit does not operate normally when the user correctly follows the operating instructions.
14. **Replacement parts** - Be sure the service technician uses replacement parts specified by the manufacturer, or that have the same characteristics as the original parts. Unauthorized substitutions may cause fire, electrical shock, or other hazards.
15. **Safety check** - Safety checks should be performed upon completion of service or repairs to the unit to ensure proper operating condition.
16. **Installation** - Install in accordance with the manufacturer's instructions and in accordance with applicable local codes.

17. **Attachments, changes or modifications** - Only use attachments/accessories specified by the manufacturer. Any change or modification of the equipment, not expressly approved by Bosch, could void the warranty or, in the case of an authorization agreement, authority to operate the equipment.

	EU Directives covered by this declaration:
	72/9/EC Low Voltage Directives
	89/336/EEC Electromagnetic Compatibility Directive

1.3

Important notices



Accessories - Do not place this unit on an unstable stand, tripod, bracket, or mount. The unit may fall, causing serious injury and/or serious damage to the unit. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer. When a cart is used, use caution and care when moving the cart/apparatus combination to avoid injury from tip-over. Quick stops, excessive force, or uneven surfaces may cause the cart/unit combination to overturn. Mount the unit per the manufacturer's instructions.

All-pole power switch - Incorporate an all-pole power switch, with a contact separation of at least 3 mm in each pole, into the electrical installation of the building. If it is needed to open the housing for servicing and/or other activities, use this all-pole switch as the main disconnect device for switching off the voltage to the unit.



CAUTION!

Class I LED PRODUCT
IEC60825-1 Ed. 1.2 (2001)

Invisible LED radiation when open. Avoid exposure to beam.

Coax grounding:

- Ground the cable system if connecting an outside cable system to the unit.
- Connect outdoor equipment to the unit's inputs only after this unit has had its grounding plug connected to a grounded outlet or its ground terminal is properly connected to a ground source.
- Disconnect the unit's input connectors from outdoor equipment before disconnecting the grounding plug or grounding terminal.
- Follow proper safety precautions such as grounding for any outdoor device connected to this unit.

U.S.A. models only - Section 810 of the *National Electrical Code, ANSI/NFPA No.70*, provides information regarding proper grounding of the mount and supporting structure, grounding of the coax to a discharge unit, size of grounding conductors, location of discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.



Disposal - Your Bosch product was developed and manufactured with high-quality material and components that can be recycled and reused. This symbol means that electronic and electrical appliances, which have reached the end of their working life, must be collected and disposed of separately from household waste material. Separate collecting systems are usually in place for disused electronic and electrical products. Please dispose of these units at an environmentally compatible recycling facility, per *European Directive 2002/96/EC*.

Electronic Surveillance - This device is intended for use in public areas only. U.S. federal law strictly prohibits surreptitious recording of oral communications.

Environmental statement - Bosch has a strong commitment towards the environment. This unit has been designed to respect the environment as much as possible.

Electrostatic-sensitive device - Use proper CMOS/MOS-FET handling precautions to avoid electrostatic discharge.

NOTE: Wear required grounded wrist straps and observe proper ESD safety precautions when handling the electrostatic-sensitive printed circuit boards.

Fuse rating - For protection of the device, the branch circuit protection must be secured with a maximum fuse rating of 16A. This must be in accordance with *NEC800 (CEC Section 60)*.

Moving - Disconnect the power before moving the unit. Move the unit with care. Excessive force or shock may damage the unit and the hard disk drives.

Outdoor signals - The installation for outdoor signals, especially regarding clearance from power and lightning conductors and transient protection, must be in accordance with *NEC725* and *NEC800 (CEC Rule 16-224 and CEC Section 60)*.

Permanently connected equipment - Incorporate a readily accessible disconnect device external to the equipment.

Pluggable equipment - Install the socket outlet near the equipment so it is easily accessible.


Power resupply - If the unit is forced to power down due to exceeding the specified operating temperatures, disconnect the power cord, wait for at least 30 seconds, and then reconnect the power cord.

Power lines - Do not locate the unit near overhead power lines, power circuits, or electrical lights, nor where it may contact such power lines, circuits, or lights.

SELV - All the input/output ports are Safety Extra Low Voltage (SELV) circuits. SELV circuits should only be connected to other SELV circuits.

Because the ISDN circuits are treated like telephone-network voltage, avoid connecting the SELV circuit to the Telephone Network Voltage (TNV) circuits.

System ground/Safety ground

System (video) ground is indicated by the symbol .

Safety (power) ground is indicated by the symbol .

The system ground is only used to comply with safety standards or installation practices in certain countries. Bosch does **not** recommend connecting system ground to safety ground unless it is explicitly required. However, if the system ground and safety ground are connected and grounding loops are causing interference in the video signal, use an isolation transformer (available separately from Bosch).



CAUTION!

Connecting System ground to Safety ground may result in ground loops that can disrupt the CCTV system.

Unit grounding - For mounting the unit in potentially damp environments, ensure to ground the system using the ground connection of the power supply connector (see *Section 5.1 Power Cable Requirements, page 17*).

Video loss - Video loss is inherent to digital video recording; therefore, Bosch Security Systems cannot be held liable for any damage that results from missing video information. To minimize the risk of lost digital information, Bosch Security Systems recommends multiple, redundant recording systems, and a procedure to back up all analog and digital information.

1.4

FCC & ICES compliance

FCC Information

(U.S.A. and Canadian Models Only)

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to *part 15* of the *FCC Rules*. These limits are designed to provide reasonable protection against harmful interference in a **residential installation**. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient or relocate the receiving antenna;
- increase the separation between the equipment and receiver;
- connect the equipment into an outlet on a circuit different from that to which the receiver is connected;
- consult the dealer or an experienced radio/TV technician for help.

Intentional or unintentional modifications, not expressly approved by the party responsible for compliance, shall not be made. Any such modifications could void the user's authority to operate the equipment. If necessary, the user should consult the dealer or an experienced radio/television technician for corrective action.

The user may find the following booklet, prepared by the Federal Communications Commission, helpful: *How to Identify and Resolve Radio-TV Interference Problems*. This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00345-4.

Informations FCC et ICES

(modèles utilisés aux États-Unis et au Canada uniquement)

Suite à différents tests, cet appareil s'est révélé conforme aux exigences imposées aux appareils numériques de **classe B**, en vertu de la *section 15 du règlement* de la *Commission fédérale des communications des États-Unis (FCC)*, et en vertu de la norme *ICES-003 d'Industrie Canada*. Ces exigences visent à fournir une protection raisonnable contre les interférences nuisibles lorsque l'appareil est utilisé dans le cadre d'une **installation résidentielle**. Cet appareil génère, utilise et émet de l'énergie de radiofréquences et peut, en cas d'installation ou d'utilisation non conforme aux instructions, engendrer des interférences nuisibles au niveau des radiocommunications. Toutefois, rien ne garantit l'absence d'interférences dans une installation particulière. Il est possible de déterminer la production d'interférences en mettant l'appareil successivement hors et sous tension, tout en contrôlant la réception radio ou télévision. L'utilisateur peut parvenir à éliminer les interférences éventuelles en prenant une ou plusieurs des mesures suivantes:

- Modifier l'orientation ou l'emplacement de l'antenne réceptrice;
- Éloigner l'appareil du récepteur;
- Brancher l'appareil sur une prise située sur un circuit différent de celui du récepteur;
- Consulter le revendeur ou un technicien qualifié en radio/télévision pour obtenir de l'aide.

Toute modification apportée au produit, non expressément approuvée par la partie responsable de l'appareil, est strictement interdite. Une telle modification est susceptible d'entraîner la révocation du droit d'utilisation de l'appareil.

La brochure suivante, publiée par la Commission fédérale des communications (FCC), peut s'avérer utile : *How to Identify and Resolve Radio-TV Interference Problems (Comment identifier et résoudre les problèmes d'interférences de radio et de télévision)*. Cette brochure est disponible auprès du U.S. Government Printing Office, Washington, DC 20402, États-Unis, sous la référence n° 004-000-00345-4.

1.5 UL Certification

Disclaimer

Underwriter Laboratories Inc. ("UL") has not tested the performance or reliability of the security or signaling aspects of this product. UL has only tested fire, shock and/or casualty hazards as outlined in UL's *Standard(s) for Safety for Closed Circuit Television Equipment, UL 2044*. UL Certification does not cover the performance or reliability of the security or signaling aspects of this product.

UL MAKES NO REPRESENTATIONS, WARRANTIES, OR CERTIFICATIONS WHATSOEVER REGARDING THE PERFORMANCE OR RELIABILITY OF ANY SECURITY OR SIGNALING-RELATED FUNCTIONS OF THIS PRODUCT.

Disclaimer

Underwriter Laboratories Inc. ("UL") has not tested the performance or reliability of the security or signaling aspects of this product. UL has only tested fire, shock and/or casualty hazards as outlined in UL's *Standard(s) for Safety for Information Technology Equipment, UL 60950-1*. UL Certification does not cover the performance or reliability of the security or signaling aspects of this product.

UL MAKES NO REPRESENTATIONS, WARRANTIES, OR CERTIFICATIONS WHATSOEVER REGARDING THE PERFORMANCE OR RELIABILITY OF ANY SECURITY OR SIGNALING-RELATED FUNCTIONS OF THIS PRODUCT.

1.6 Explosion Protected Certifications

Illuminator for Use in Hazardous Locations
 Bosch Security Systems B.V.
 LED-65 Illuminator models
 12-24 VDC, 12-24 VAC, Class 2, 37 watts



LISTED

Control number 3RR9
 Class I, Groups C, and D; Class II, Groups E, F, and G; Class III
 Class I, Zone 1, AEx d IIB T6; Ex d IIB T6 X
 AEx tD 21 T85°C
 DIP DIP A21 Ta85°C X
 Type 4X, IP67

DEMKO 10 ATEX 0948139X
 CE 0344 II 2 GD
 Ex d IIB T6 Gb
 Ex tb IIIC T85°C Db IP67
 -50 °C < Ta < 60 °C

1.7 Joint Information

Joint-Threaded (All Models)	Designation	Pitch (mm)	Full Threads Engaged	Depth of Engagement (mm)
Back Cover of Junction Box to Connection Plate of Junction Box	M 103	2	7	14.5
Housing to Connection Plate of Junction Box	M 103	2	7	18.5
Supply Opening Blanking Element to Connection Plate of Junction Box (four openings provided)	3/4-14 NPT	N/A	5	N/A
Housing and Front Cover/Fascia	M 103	2	8	18.5

To obtain more information about the flameproof joints, please contact Bosch Security Systems.



WARNING!

To reduce the risk of ignition of hazardous atmospheres, conduit runs must have a sealing fitting connected to the wall of the enclosure.



WARNING!

DO NOT OPEN WHEN AN EXPLOSIVE ATMOSPHERE MAY BE PRESENT.

1.8 Bosch notices

Copyright

This manual is the intellectual property of Bosch Security Systems and is protected by copyright. All rights reserved.

Trademarks

All hardware and software product names used in this document are likely to be registered trademarks and must be treated accordingly.

NOTE:

This manual has been compiled with great care and the information it contains has been thoroughly verified. The text was complete and correct at the time of printing. The ongoing development of the products may mean that the content of the user guide can change without notice. Bosch Security Systems accepts no liability for damage resulting directly or indirectly from faults, incompleteness or discrepancies between the user guide and the product described.

More information

For more information, please contact the nearest Bosch Security Systems location or visit www.boschsecurity.com.

1.9 Warranty / Limitation of Liability

The EX65 has a 3 year warranty.

BOSCH Security Systems warrants that its products, at the time of shipment by BOSCH Security Systems, are free from defect in material or workmanship under normal use and service for the respective warranty periods specified in the applicable Price Schedule or as otherwise published.

To assure conformance with operating limitations, Buyer should refer to the applicable data sheet.

The warranty is void (i) if the Product is not operated in conformance with installation, environmental, mechanical or electrical requirements, or within thermal stress limits, or (ii) to the extent that any malfunction is the result of misuse, abuse, vandalism, neglect, improper installation or application, alteration, accident, or negligence in use, storage, transportation, or handling or if the original identification markings on the product have been removed, defaced or altered, lightning, electricity, water, fire, environment or other hazard, or act of God, or other impact outside of normal operating guidelines.

The foregoing warranty is subject to Buyer's (i) promptly written claim and (ii) timely provision to BOSCH Security Systems of an opportunity to inspect and test the Product claimed to be defective. Such inspection may be on Buyer's premises and/or BOSCH Security Systems may request the return of the Product at Buyer's expense. However, BOSCH Security Systems shall not be responsible for packing, inspection, or labor costs in connection with the return of Product. No Product shall be accepted for warranty service that is not accompanied by a Return Authorization issued by BOSCH.

The liability of BOSCH Security Systems hereunder or otherwise is solely and exclusively limited to replacement (new or refurbished Product), repair, or credit of the amortized purchase price, as BOSCH Security may elect, for any Product which is returned by Buyer during the applicable warranty period, or services for which timely notice of defect has been given by Buyer, and which are found by BOSCH Security to be subject to adjustment under this warranty.

BOSCH Security System's warranty shall not be enlarged, diminished, or affected by, and no obligation or liability shall arise or grow out of BOSCH Security's rendering or technical advice, facilities, or services in connection with Buyer's order to the products furnished hereunder.

For more information about the warranty on this product, see the Warranty Repair section on Bosch's Customer Care web page at www.boschsecurity.us/en-us/Service/CustomerCare.

2 Description

The EX65 Explosion Protected Illuminator is the world's first Intelligent infrared illuminator for explosive environments, combining the latest innovations in infrared technology and design to deliver the highest quality CCTV illumination for critical surveillance applications.

Electropolished 316L stainless steel construction ensures the ultimate environmental protection available today. A single pre-assembled unit with an integrated junction box, the EX65 is designed to be easy to install. Through any of the four (4) 3/4 in. conduit entries, connections are made to the convenient terminal block; there is also space for any additional wiring. All connections are conveniently accessible within the junction box including power and telemetry.

Constant Light technology compensates for LED degradation, a natural occurrence with all LED-based illuminators, to deliver a constant level of lighting performance throughout the life of the illuminator.

2.1 Unpacking

This electronic equipment should be unpacked and handled carefully. If an item appears to have been damaged in shipment, notify the shipper immediately.

Verify that all the parts listed in the Parts List below are included. If any items are missing, notify your Bosch Security Systems Sales or Customer Service Representative.

The original packing carton is the safest container in which to transport the unit and must be used if returning the unit for service. Save it for possible future use.

2.2 Parts List

2.2.1 Parts Included with the Product

Quantity	Item
1	EX65 Explosion Protected Illuminator
1	Sunshield
4	M4 bolts with washers for sunshield
1	1.5 mm hex key
1	Multi-use tool
1	Instruction Manual

2.2.2 User-supplied Parts

Quantity	Item
3	M6 x 1.0 x 16 mm bolts with lock washers
1	Bottle of Jet-Lube® NCS-30 grease (as needed)
1	Tube of Molykote® BG 20 grease (as needed)
1	Tube of LA-CO Slic-Tite® Paste with PTFE (as needed)

3 Planning

Refer to the information below before installing the unit. This section provides dimensional information and guidelines to help plan your installation.

3.1 Dimensional Drawings

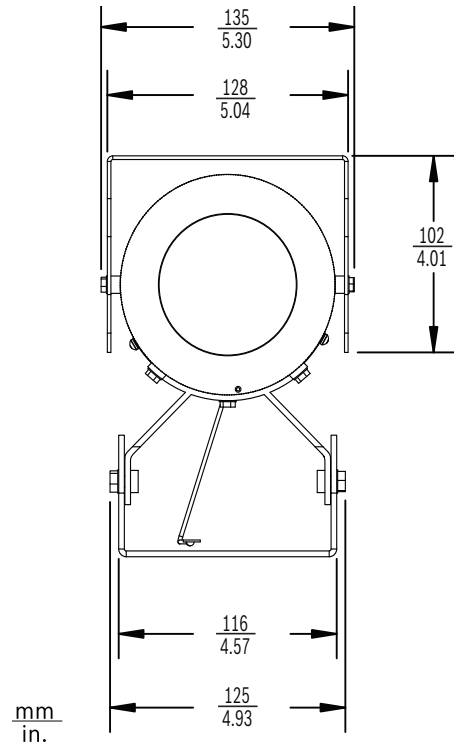


Figure 3.1 Front View

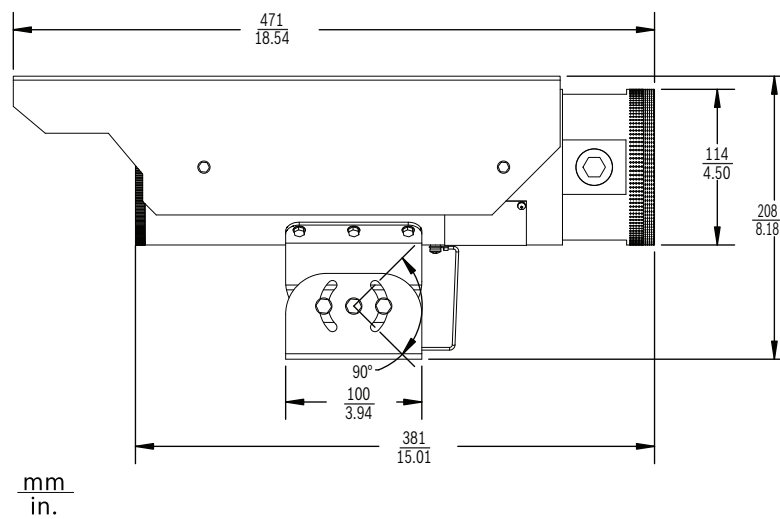


Figure 3.2 Side View

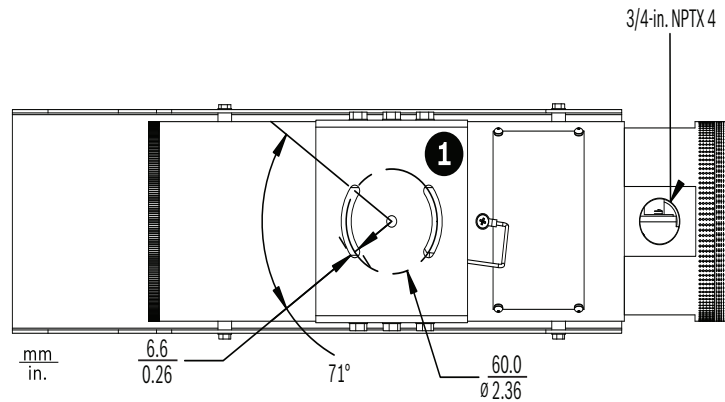


Figure 3.3 Bottom View

3.2

Initial Preparations

- Determine the operating voltage at the installation site. The circuit board automatically configures for 12 VDC or 24 VAC operation. The unit can receive an input voltage range of 10.5 VDC to 40 VDC or 12 VAC to 28 VAC without damage, but it is recommend to stay within the voltage range specified in *Section 1.6 Explosion Protected Certifications*.
- All units have been tested prior to shipment. It is advisable to check the unit's operation before installation.



CAUTION!

It is recommended that the installer wear an ESD strap or discharge any static electricity to ground before handling any electronic components.

4 Installation

This chapter details the installation guidelines for the EX65. It is important that you consider these steps.



WARNING!

Do not apply power to the unit in an explosive environment unless the housing is fully installed, the front and back caps are tightened, and all openings are appropriately plugged and sealed. Disconnect power before servicing or disassembling the unit.

Based on the explosion protected requirements of the installation location, determine the appropriate installation method and follow all local guidelines and laws. It is important to keep the following in mind during installation:

- It is advisable to set the photocell sensitivity and illuminator intensity prior to installation. Only make adjustments if necessary as these settings are optimally set from the factory. See *Section 6 Configuration, page 20*.
- The back end cap of the unit must be removed for access to the internal electronics. The set screws on the caps are tightened at the factory. It is easier to remove the front end cap with the sunshield removed.
- When tightening the end caps, ensure that the threads are clean and lubricated with Jet-Lube® NCS-30 grease or equivalent.
- Before tightening the end caps, ensure that the o-rings are clean and lubricated with Molykote® BG 20 grease (from Dow Corning) or equivalent.
- Ensure that all 3/4-in. NPT plugs are securely tightened in the 3/4-in. NPT conduit openings and sealed with LA-CO Slic-Tite® Paste with PTFE, apply per manufacturer's instructions on the label.
- Ensure that the unit is wired and sealed appropriately either with a conduit seal or a gland and cable rated for the intended environment. Use LA-CO Slic-Tite® Paste with PTFE thread sealant on all conduit or gland threads.
- Carefully follow all manufacturers' instructions for applying grease and paste products.
- If cable glands are used, they shall be certified for ATEX and IECEx certified for Ex d IIB Gb and Ex tb IIIB Db IP67 rated at least 85 °C.
- All unused conduit openings shall have a 3/4-14 in. NPT stopping plug certified for Class I, Groups C, and D; Class II, Groups E, F, and G; and Class III; Class I, Zone 1, AEx d IIB; AEx tD 21; Ex d IIB; DIP A21 hazardous locations, as supplied with the unit.
- Unused conduit openings shall be closed with the provided conduit plug.
- The maximum surface temperature of the unit will never reach 85 °C when used throughout the ambient operating range of –50 °C to 60 °C (–58 °F to 140 °F).
- If starting up the unit below –40 °C, there may be a delay.
- The joint between the junction box and housing is secured by a thread locker for permanent securement. This joint shall not be removed because there may be damage to the flamepath.
- The device was subjected to the resistance to impact test at 2 J. It shall be installed where it will not be subjected to impact.
- For ambient temperatures below –10 °C, use field wiring suitable for the minimum ambient temperature.

5 Connections

All required connections are accessible by removing the end cap conveniently located in the rear of the EX65.



NOTICE!

Take care not to drop the end caps to prevent damage to the cap threads.

5.1 Power Cable Requirements



WARNING!

Before proceeding, disconnect the power from the power supply cable. Ensure that the voltage of the unit matches the voltage and type of the power supply being used.

Connect power from a 12 - 24 VAC or 12 - 24 VDC class 2 power supply. Use AWG 16 to 22 stranded wire or AWG 16 to 26 solid wire; cut back 5 mm (0.2 in.) of insulation.

Cable size	Stranded wire: AWG 16 to 22 Solid wire: AWG 16 to 26
Cable shape	Round
Conductors	2-conductor version
Environmental	Outdoor rated

5.1.1 Wire Distance Guide

This table lists the maximum wire distances for 14, 16, and 18 AWG wires connected to a 24 VAC illuminator.

	Watts	14 AWG (2.5 mm)	16 AWG (1.5 mm)	18 AWG (1.0 mm)
LED-658 Series	37	133 m	84 m	53 m
LED-659 Series		(438 ft)	(276 ft)	(173 ft)

5.2 Telemetry Cable Requirements

The EX65 terminal block contains two terminals for telemetry cables from a remote illuminator control device.

Max. wire diameter	AWG 22-28 for both stranded and solid; cut back 5 mm (0.2 in) of insulation
Telemetry in	Normally Open connection, remove jumper to use external control device

5.3 Making the Connections

Refer to the following illustration when making connections:

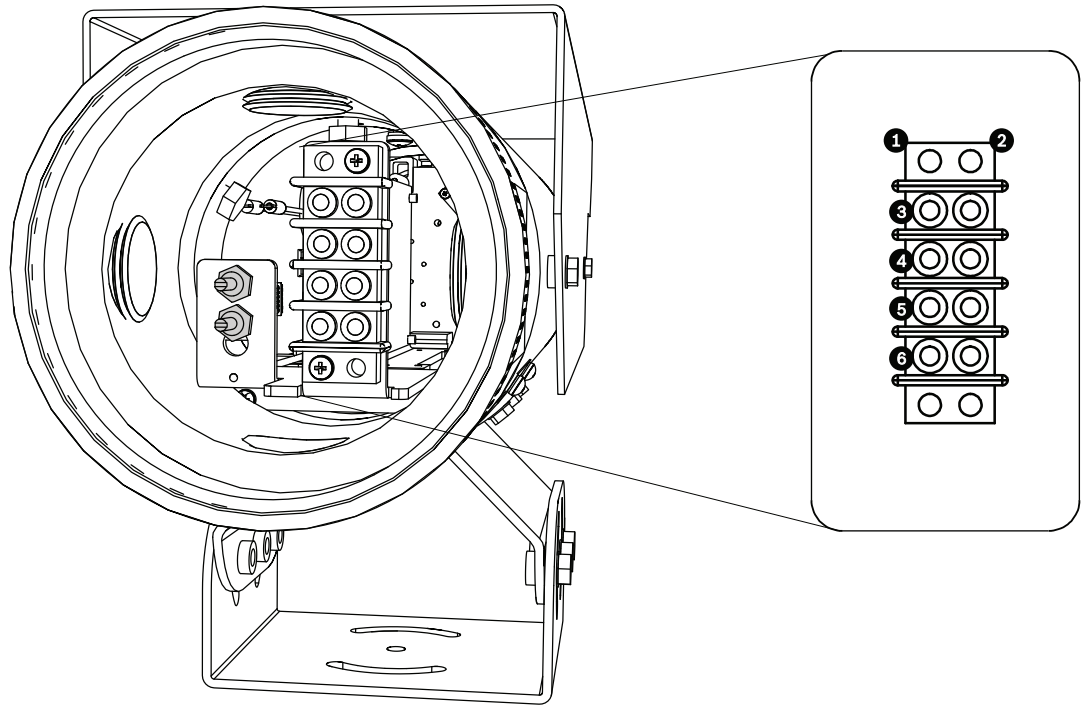


Figure 5.1 EX65 Cable Connection Terminators

1	Terminals for incoming power and telemetry cables
2	Internal illuminator use. DO NOT connect any cables to these terminals.
3	Power In (12–24 VDC/12–24 VAC)
4	Power In (12–24 VDC/12–24 VAC)
5	Telemetry (for remote illuminator control)
6	Telemetry (for remote illuminator control)



CAUTION!

Connections to the terminal block must be made to the terminals on the left side. Do not make connections to the terminals on the right side of the block.

1. Loosen the set screws on the rear end cap using the supplied hex key. Loosen the rear end cap using the supplied multi-use tool. To prevent damage to the o-ring, for every half turn counterclockwise turn back one quarter-turn clockwise. (see *Figure 5.2* below).
Note: To prevent damage to the cap threads, take care not to drop the end caps.

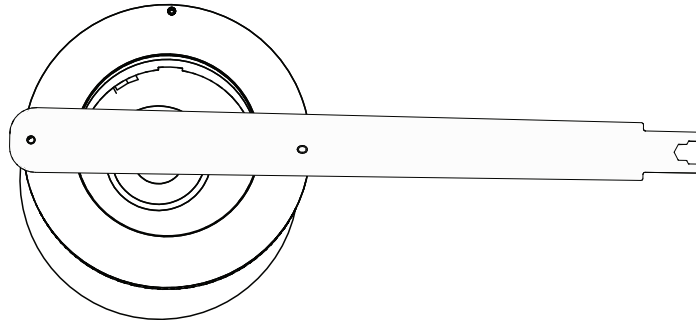


Figure 5.2 Removal of end cap with multi-use tool

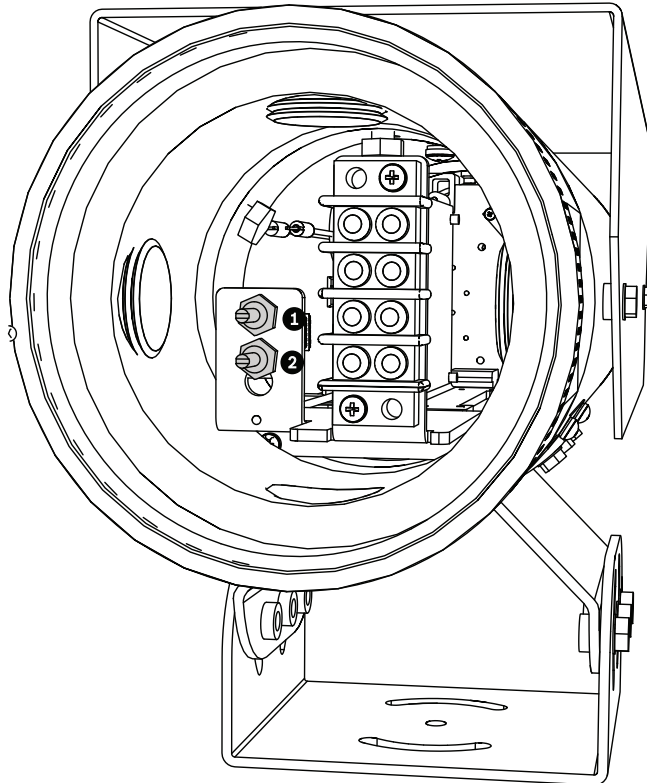
2. Feed power and telemetry (if used) cables through any one of the four 3/4-in. conduit entries.
3. Connect one lead of the power cable to terminal 3 and the other lead to terminal 4.
Note: The power in terminals are polarity insensitive.
4. Connect the two leads from a remote illuminator control device to terminals 5 and 6. This connection is set to Normally Open (NO). When the connection is closed, the illuminator is activated.
Note: The photocell controls the day/night switch operation, which prevents the Illuminator turning on in daylight conditions.
5. Make sure that the o-ring and threads are clean and greased before replacing the rear end cap. Use the supplied multi-use tool to tighten the rear end cap. Ensure that the o-ring is properly seated. After tightening, ensure that there is no gap between the cap and the body of the housing.
6. Tighten the set screws on the rear end cap using the supplied hex key.

6 Configuration

Making Adjustments to the Illuminator

To make adjustments to the illuminator intensity and sensitivity, remove the rear end cap to access these controls:

- Intensity: adjusts the intensity of the infrared illumination emanating from the EX65.
Note: The intensity level is set to maximum at the factory.
- Photocell Sensitivity: controls the level of ambient light necessary to activate the illuminator.



1	Intensity control
2	Photocell Sensitivity control

1. Turn the Intensity control (item 1, above) clockwise to increase the level of infrared illumination.
2. Turn the Photocell Sensitivity control (item 2, above) clockwise to increase sensitivity, or turn the control counterclockwise to decrease sensitivity.

7 Mounting

7.1 Mounting the EX65

Follow all local codes with respect to the wiring and installation of explosion protected housings.



CAUTION!

Ensure the selected location is protected from falling objects, accidental contact with moving objects, and unintentional interference from personnel. Follow all applicable building codes.

The following installation guidelines must be followed:

- Locate the unit such that it cannot be easily interfered with, either intentionally or accidentally.
- Select mounting hardware and a mounting surface capable of supporting the combined weight of the equipment under all expected conditions of vibration and temperature.
- Secure all cabling.

The EX65 can be mounted to a compatible Bosch bracket with M6 bolts or any purpose-built bracket using M6 or 1/4 in.–20 bolts. Ensure that a fabricated bracket is capable of supporting at least three times the weight of the system. See *Figure 7.1* below to match the mounting cradle holes.

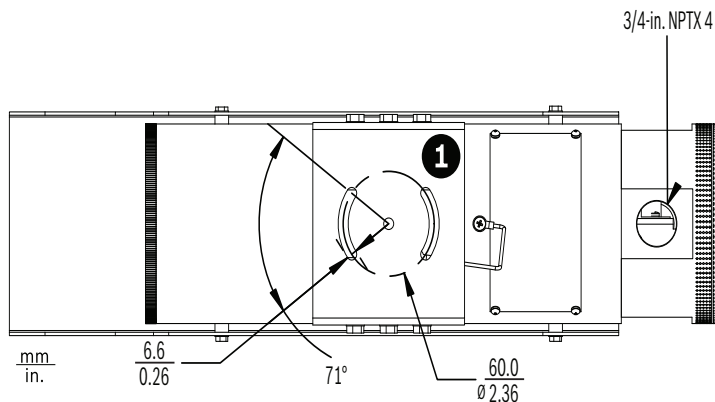
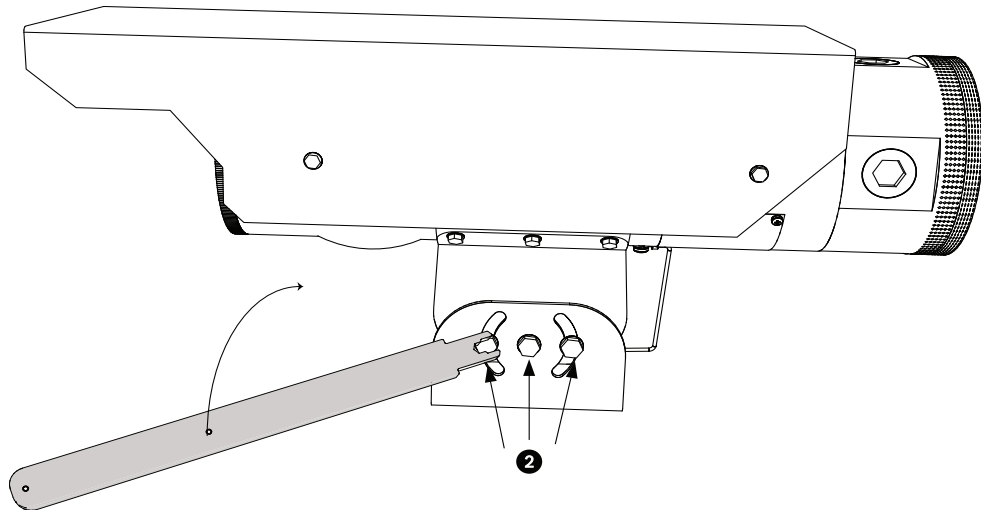


Figure 7.1 Bottom View with Mounting Cradle detail

1. Choose a mounting surface and, if needed, prepare the surface by pre-drilling and tapping three M6 x 1.0 x 20 mm holes in a line that are 30 mm apart center to center and in line with the desired surveillance target (see *Figure 7.1*).
2. Allocate three stainless steel M6 x 1.0 x 16 mm bolts with lock washers and ensure that the mounting surface and the threads of bolts are clean and free of debris.
3. Optionally apply a few drops of a medium strength thread locking agent to the bolts per the manufacturer's instructions.
4. Secure the mounting cradle (see *Figure 7.1*, item 1) to the mounting surface with the M6 x 1.0 x 16 mm bolts and lock washers using a 10 mm wrench or the supplied multi-use tool. Do not tighten fully.

5. Slightly loosen the six M6 bolts on both sides of the mounting cradle, using a 10mm wrench or the supplied multi-use tool, and make directional adjustments to the EX65 so that it is pointing at the desired surveillance target (see the graphics below).



6. Tighten all mounting bolts to 3 to 5 ft-lb (4.1 to 6.8 N·m).
7. Connect wiring as explained in *Section 5 Connections, page 17*, and follow all local regulations and laws regarding explosion protected devices.
8. Connect the ground cable, located on the bottom of the housing, to a suitable grounded material (grounded conduit or a ground wire).

7.2

Installing the Sunshield

1. Line up the mounting holes of the sunshield with the tapped holes in the body of the EX65.
2. Install the supplied M4 bolts through the sunshield bolt holes into the body of the unit and tighten by hand.
3. Tighten the supplied bolts to 1.5 ft/lb (2.0 N/m) using a 7 mm wrench or the supplied multi-use tool.

8 Troubleshooting

8.1 Illuminator Operation

The following table is intended to help you identify the causes of malfunctions and correct them when possible.

Issue	Possible Solution
Fuse blows	<ul style="list-style-type: none"> – Check the fuse rating. – Check for shorting between the housing and the input power wires.
Cannot tell if LEDs are ON	850 nm LEDs will have a faint red glow when ON. 940nm LEDs are covert. To check: <ul style="list-style-type: none"> – Aim the LEDs directly at an IR sensitive camera, or – Wait for the LEDs to warm up (two minutes).
LEDs are not ON	<ul style="list-style-type: none"> – Cover the photocell to activate power to the LEDs (up to 30 seconds delay for activation). – Adjust the photocell sensitivity control. See <i>Section 6 Configuration, page 20</i>. – Adjust power to the LEDs.
LEDs do not turn OFF when sufficient ambient light is present	<ul style="list-style-type: none"> – Make sure the photocell is not covered or hidden behind any object. – Adjust the photocell sensitivity control. See <i>Section 6 Configuration, page 20</i>. The LEDs remain ON or OFF if the adjustment is at full turn.
LEDs oscillating ON and OFF	<ul style="list-style-type: none"> – Adjust the photocell sensitivity control. See <i>Section 6 Configuration, page 20</i>. – Remove any objects in front of the LEDs that are causing reflections back to the photocell sensor.

9 Maintenance

9.1 Repairs

**DANGER!**

Disconnect power before servicing or disassembling the housing or unit. Never remove the front or end caps unless power is disconnected from the EX65.

The EX65 has some user replaceable parts, including the front and rear end caps and the mounting cradle. These parts are available as spare parts, please contact your local service center for information in obtaining these parts.

9.2 Transfer and Disposal

The unit should only be passed on together with this installation guide. The unit contains environmentally hazardous materials that must be disposed of according to law. Defective or superfluous devices and parts should be disposed of professionally or taken to your local collection point for hazardous materials.

9.3 Replacement of the Mounting Cradle

1. Disconnect power from the EX65 and, optionally, remove all connections.
2. Using a 10 mm wrench or the supplied multi-use tool, remove the three (3) M6 bolts holding the mounting cradle to the mounting surface.
3. Put the EX65 in a safe location.
4. Using a 7 mm wrench or the supplied multi-use tool, remove the seven (7) M4 bolts holding the mounting cradle to the housing.
5. Install a new mounting cradle in reverse of installation and tighten the seven (7) M4 bolts to 1.5 ft/lb (2.0 N/m).
6. Finish installation as described in *Section 7 Mounting, page 21*.

10

Technical Data

Technical Data - EX65 Illuminator

Electrical

Model No.	Rated Voltage	Wavelength
LED-658-AM	12 VDC/24 VAC (±10%)	850 nm
LED-658-AW	12 VDC/24 VAC (±10%)	850 nm
LED-659-AM	12 VDC/24 VAC (±10%)	940 nm
LED-659-AW	12 VDC/24 VAC (±10%)	940 nm
LED-658-SM	12 VDC/24 VAC (±10%)	850 nm
LED-658-SW	12 VDC/24 VAC (±10%)	850 nm
LED-659-SM	12 VDC/24 VAC (±10%)	940 nm
LED-659-SW	12 VDC/24 VAC (±10%)	940 nm
Power Consumption	37 W	

Mechanical

Dimensions (H x W x L)	
	381 mm x 114 mm x 114 mm (11.01 in. x 4.5 in. x 4.5 in.)
Weight	
– Stainless Steel	12.7 kg (28 lb)
– Aluminum	6.1 kg (13.5 lb)
Construction	Electropolished 316L Stainless Steel or Anodized Aluminum
View Window	9 mm (0.35 in.) thick borosilicate float glass
Bracket Pan/Tilt Range	Pan: ±36° Tilt: ±45°

Environmental

Operating Temperature	-50 °C to +60 °C (-58 °F to 140 °F)
Storage Temperature	-55 °C to +70 °C (-67 °F to 158 °F)
Operating Humidity	0% to 100% relative (condensing, after installed and sealed)
Storage Humidity	20% to 98% relative (non-condensing)

Glossary

A

AES

Automatic Electronic Shutter (see Electronic iris).

Aperture

The size of the opening in the lens iris that controls the amount of light reaching the CCD Sensor. The larger the F-number, the less light reaches the sensor. An increase of one F-stop, halves the amount of light reaching the sensor.

Auto Level Control (ALC)

The adjustment of the video level to give the desired brightness level. This can be done electronically or by means of an iris control.

Auto White Balance (AWB)

A feature that allows a color camera to automatically adjust its output color to give a natural color, independent of the lighting used.

AutoBlack

A technique of boosting the video signal level to produce a full amplitude video signal, even when the scene contrast is less than full range (glare, fog, mist, etc.).

Autolris

The lens iris opening is automatically adjusted to allow the correct illumination of the camera sensor. With a direct drive (DC) iris lens, the camera controls the aperture size. A video iris lens has the control circuit in the lens itself.

Automatic Gain Control (AGC)

The electronics that regulate the gain or amplification of the video signal. AGC is used in low-light conditions with the iris fully open.

B

Back Light Compensation (BLC)

Selectively amplifies parts of the image to compensate for large contrast differences when only a portion of the image is brightly lit (e.g. a person in a sunlit doorway). See also Smart BLC.

Backfocus

The distance between the image plane and the rear portion of the lens. Correct backfocus adjustment ensures that the camera remains in focus under various conditions.

Bilinx

A communications protocol that allows remote control, configuration, and updates to be performed over the video cable (Coax or Passive UTP).

Bilinx address

The address may be set locally using the Bilinx Configuration Tool for Imaging Devices (CTFID).

C

CCD Format

Indicates the size of the camera sensor used. In general, the larger the sensor, the more sensitive the camera and the better the image quality. The format is quoted in inches, for example 1/3 or 1/2 inch.

Charged Coupled Device (CCD)

A CCD is a type of solid state image sensor used in CCTV cameras. The sensor converts light energy into electrical signals.

Color Temperature

A measure of the relative color of illumination. Generally used to specify the color balance correction of a camera to achieve a natural color image.

D

Day/Night (infrared sensitive)

A camera that has normal color operation in situations where there is sufficient illumination (day conditions), but where the sensitivity can be increased when there is little light available (night conditions). This is achieved by removing the infrared cut filter required for good color rendition. The sensitivity can be further enhanced by integrating a number of fields to improve the signal-to-noise ratio of the camera (this may introduce motion blur).

Default Shutter

A feature allowing the shutter speed to be set to a fast speed to eliminate motion blur and provide a detailed and clear image of fast-moving objects while there is sufficient light. When light levels fall and other adjustments have been exhausted, the shutter speed reverts to the standard setting to maintain sensitivity.

Depth of Field

The distance from the nearest to the furthest point that appears in focus. The smaller the aperture, the greater the depth of field.

Dynamic Noise Reduction (DNR)

A digital video processing technique that measures the noise (image artifacts) in the picture and automatically reduces it.

E

Electronic iris

Electronic iris (or AES - Automatic Electronic Shutter) adjusts the camera shutter speed to compensate for lighting changes. In some cases this can eliminate the need for an autoiris lens.

F

F-Number

The standard measure of the lens aperture, which is the iris diameter, divided by the focal length of the lens. The lower the maximum aperture (F-Number or F-Stop), the more light that passes through the lens.

F-Stop

See F-Number

Field of View

The measure of the visible area within the camera's field of view. The larger the focal length, the smaller the field of view. The smaller the focal length, the wider the field of view.

Focal Length

The distance from the optical center of the lens to the image of an object located at an infinite distance from the lens. Long focal lengths give a small field of view (e.g. telephoto effect), while short focal lengths give a wide angle view.

I

Infrared Illumination

Electromagnetic radiation (light) with a longer wavelength than is visible to the human eye. IR illumination is prominent at dusk and dawn and in incandescent lamps. IR illuminators come in the form of lamps with the appropriate filters, LEDs, or lasers. CCD sensors are less sensitive to IR than visible light, but IR can significantly increase the total illumination level, leading to a much better image at low light levels.

IRE (Institute of Radio Engineers)

A measurement of video amplitude that divides the area from the bottom of sync to peak white level into 140 equal units - 140 IRE equals 1V peak-to-peak. The range of active video is 100 IRE.

L

Lens wizard

The lens wizard is used when setting the backfocus. It opens the iris fully while maintaining the correct video level using AES.

Lux

The international (SI) unit of measurement of the intensity of light. It is equal to the illumination of a surface one meter away from a single candle.

O

OSD

On-screen Display: Menus are shown on the display monitor.

P

Privacy Masking

The ability to mask out a specific area to prevent it from being viewed in order to comply with privacy laws and particular site requirements.

PWIE

Peak White Inverse Engine: White highlights are automatically turned black to reduce bright spots. Useful in traffic and car park applications.

R

Region of Interest

A specific area within a field of view, used by the motion detection algorithm to identify motion.

Resolution

The measure of the fine detail that can be seen in an image. For analog systems this is typically measured in horizontal Television Lines or TVL. The higher the TVL rating, the higher the resolution.

S

Saturation

The amplitude of the chrominance signal affecting the vividness of the color.

Sensitivity

A measure of the amount of light required to provide a standard video signal. Sensitivity values are stated in lux (*see* Lux).

SensUp (sensitivity up)

Increases camera sensitivity by increasing the integration time on the CCD (lowering shutter time from 1/50 to 1/5 s). This is accomplished by integrating the signal from a number of consecutive video fields to reduce signal noise.

Signal-to-noise ratio

The ratio between a useful video signal and unwanted noise measured in dB.

Smart BLC (Back Light Compensation)

Smart back-light compensation allows the camera to automatically compensate for bright areas of a high contrast scene without having to define a window or area.

U

UTP (Unshielded Twisted Pair)

A variant of twisted pair cabling, UTP cable is not surrounded by any shielding. The wires in a twisted pair cable are twisted around each other to minimize interference from the other twisted pairs in the cable. UTP is the primary wire type for telephone usage and the most commonly used type of networking cable.

V

VMD

Video Motion Detection: An algorithm for motion detection in which the camera compares the current image with a reference image and counts the number of pixels that have changed between the two images. An alarm is generated when the number of pixel changes exceeds a user-configured threshold.

W

WDR (Wide Dynamic Range)

A camera's dynamic range is the difference between the minimum and maximum acceptable signal levels. A scene with both very low and very high illumination levels requires a camera with a wide dynamic range to handle it correctly and produce a useful image.

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